

## FIRST CATERPILLAR OBSERVATIONS OF THE MORMON METALMARK BUTTERFLY IN GRASSLANDS NATIONAL PARK, SASKATCHEWAN

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The Mormon Metalmark butterfly is the only species of the primarily tropical lepidopteran family Riodinidae found in Canada. The species is commonly found in arid regions of western North America. Its range is relatively contiguous through California, Nevada, Utah, and Colorado. Farther north, the populations become more disjunct.<sup>1</sup> There are only two known Canadian populations, one in the southern Similkameen River Valley of British Columbia, and one in the prairie badlands of southern Saskatchewan, primarily in Grasslands National Park.<sup>2,3</sup> These populations are listed respectively as Endangered and Threatened under the Federal Species At Risk Act.<sup>1</sup> During field work from May to August 2009, we documented the first Canadian observations of Mormon Metalmark caterpillars.

During June and July, Mormon Metalmark caterpillars were observed in Laouenan, Timmons, and 70 Mile Butte, in the West Block of Grasslands National Park, where metalmark butterflies had been located in previous field seasons. The first two sites are on gentle-sloping coulee bottoms, and the third is on the steep slope of a butte. All three are

on sparsely vegetated clay soil where the primary host plant, the Branched Umbrella Plant (*Eriogonum pauciflorum*) grows. Mormon Metalmark caterpillars are crepuscular and are typically active just before sunrise and shortly after sunset. Most of the morning observations were conducted during twilight and thereafter for 3-4 hours, until the caterpillars sought shelter out of view. A few observations took place in the evenings, from sunset until the caterpillars sought shelter for the night. We had relatively shorter evening observations because the caterpillars were active for a short period of time (the longest evening observation was approximately 1 hour). Evening observations at all three butterfly sites confirmed that the caterpillars actively forage briefly after sunset in addition to the longer morning feeding session observed in more southern populations (J. Powell, pers. comm.). Temperature, rain, and wind seem to influence feeding behaviour: the caterpillars begin to feed earlier in the morning when temperatures are between 8 and 20°C (caterpillars were observed feeding as early as 0405h on 17 June), and were not observed feeding when conditions were rainy, or colder than 8°C.



Figure 1. Mormon Metalmark caterpillar, July 2009. J. Janelle

The caterpillars have a distinctive appearance, particularly the older caterpillars: the body is purple, with two dorsal and two ventral rows of yellow nodules from which protrude a clump of bristly black hairs and a single longer white hair. The eyes and mouthparts are black and bulbous. The three pairs of legs closest to the head are black, thin, and pointed, while the five pairs of prolegs (also called false legs) on the abdomen are pink, rounded, and fleshy. The first four pairs are located on abdominal segments 3-6, while the last pair of prolegs is located on the 10th abdominal segment (Fig. 1). The first caterpillar, observed on 4 June, was only 4 mm in length and was confirmed to be *Apodemia mormo* under a dissecting microscope.

The caterpillars had a staggered emergence, and individuals of different sizes and in varying instars at different times were often observed in the same umbrella plant colony on the same day (Fig. 2, see inside front cover, top). Table 1 summarizes the first wave of larval observations from June to July 2009. The largest caterpillars observed, throughout mid- to late July, were up to 25 mm long. Smaller larvae (15 mm) were also observed in late July. Caterpillar size and appearance suggests that the Mormon Metalmark has at least five instars, but

this will be confirmed in 2010 with a larger sample size.

We observed that Mormon Metalmark caterpillars feed on the leaves, flowers, and stems of the Branched Umbrella Plant (Fig. 2, see inside front cover, top). Young caterpillars (probably the first 3 instars) rarely seem to leave the host plant, as they are completely dependent on it for food and probably shelter. Older, larger caterpillars (4th and 5th instars) were observed crawling away from their host plants, into cracks in the soil and under rocks to seek shelter and possibly to avoid predators. Others crawled into neighbouring Branched Umbrella Plants, perhaps expanding their foraging opportunities.

Mormon Metalmark caterpillars are typically solitary foragers with one individual on each plant; however, occasionally up to three individuals were observed on a single plant. From May to June, many umbrella plants are enshrouded with complex silk webbings over all or part of the plant, but it is unclear which species spins this webbing. The metalmark caterpillars seemed only to shelter in very fine silk nests, as opposed to the thick, more visible silk coating many host plants. Additional studies are needed in order to determine the role of webbing in the life cycle of Mormon Metalmark caterpillars.

Young caterpillars prefer to graze the upper surface of the umbrella plant leaves, whereas older caterpillars can eat entire leaves, as well as flowerheads and leaf stems. Characteristic reddish-brown damage on the plants is evidence of feeding by young larvae (Fig. 3). After foraging, the caterpillars typically descend the main plant stems to seek shelter. The caterpillars used a variety of microhabitats such as areas under stems, in the soil or leaf litter, cracks in the substrate, under



*Figure 3. Branched Umbrella Plant with leaves eaten by Mormon Metalmark caterpillars, July 2009. S.D. Pruss*

rocks, and under woody or dead plant material on or at the base of the host plant. Occasionally, the shelter sites are coated in a layer of silk so fine it is difficult to notice until a caterpillar is observed crawling into a small silk tunnel. Many caterpillars were observed returning to

the same sheltering spots after feeding, suggesting that once an individual has found adequate shelter it tends to reuse the same area.

Caterpillars that were observed once per week from mid-June to mid-July for the duration of the morning feeding began to “fade away” when they reached 20 to 25 mm in length. We assume that many of these caterpillars had begun to pupate; however, our attempts to find some of these pupae on the plants and in the surrounding soil were unsuccessful.

Unlike the caterpillars, adult metalmark butterflies are active during the hottest hours of the day (mid-day to evening). We observed our first mating pair mid-day on 17 August (Fig. 4) in Timmons Coulee of Grasslands National Park. We suspect that the individual with the larger body size was the female, because butterfly species with discreet generations in highly seasonal climates often exhibit protandry,



*Figure 4. Mating Mormon Metalmark butterflies, 17 August 2009*

*K. Peterson*

Table 1. Mormon Metalmark caterpillar observations at Grasslands National Park, SK, 2009.

Site	Number of caterpillars observed	Date range	Number of host plants	Habitat with <i>Eriogonum pauciflorum</i>
Laouenan Coulee	8	4 June – 13 July	6	One plant on top of steep hillslope, five others on hummocky coulee bottom; on gentle west-facing slope
Timmons Coulee	9	22 June – 9 July	9	Hummocky coulee bottom; on gentle southwest-facing slope
70 Mile Butte	8	15 June – 14 July	4	Steep, sparsely vegetated south-facing slope
South Gillespie	1	25 June	1	Top of a large, hummocky hill, on northwest-facing side

a form of sexual dimorphism wherein the males tend to emerge before the females to establish territories and increase mating success.<sup>4</sup> However, this early emergence suggests that males will often be smaller, as they have not had as much time in their development to increase energy reserves and body size.<sup>4</sup> This first mating pair we observed remained joined with no discernible movements for over an hour. We observed a second pair farther east in Police Coulee on 24 August. This pair was constantly disrupted by the diving attacks of a small, persistent single individual (likely a male), and the mating pair was forced several times to change its perch location on the umbrella plant.

Our observations of Mormon Metalmark caterpillars are the first ever documented in Canada. Learning more about the ecology of the caterpillar stage, estimating population sizes, and understanding mating behaviour will help us to define

and designate critical habitat, among other priorities outlined in the federal Recovery Strategy for this species,<sup>3</sup> to ensure its protection and continued survival.

1. COSEWIC. 2003. COSEWIC assessment and update status report on the Mormon metalmark (*Apodemia mormo*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON. Available at: [http://www.sararegistry.gc.ca/document/default\\_e.cfm?documentID=261](http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=261)

2. HENDERSON, A., P. FARGEY, S. PRUSS and F. SPERLING. 2008. Early sighting of a rare butterfly, Mormon metalmark, in Grasslands National Park, SK. *Blue Jay* 66:105-106.

3. PRUSS, S.D., A. HENDERSON, P. FARGEY and J. TUCKWELL. 2008. Recovery strategy for the Mormon Metalmark (*Apodemia mormo*) prairie population, in Canada. Species at Risk Act Recovery Strategy Series. Parks Canada Agency. Ottawa, ON.

4. SINGER, M.C. 1982. Sexual selection for small size in male butterflies. *The American Naturalist* 119:440-443.



*There is nothing pleasanter than spading when the ground is soft and damp.*  
- John Steinbeck